



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------------|------------------|
| 10/065,486 | 10/23/2002 | Tin-Su Pan | 124695 | 7326 |
| 23413 | 7590 | 09/01/2006 | EXAMINER LAMPRECHT, JOEL | |
| CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 | | | ART UNIT 3737 | PAPER NUMBER |

DATE MAILED: 09/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

8P

| | | | |
|------------------------------|--------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/065,486 | Applicant(s) PAN ET AL. | |
| | Examiner Joel M. Lamprecht | Art Unit 3737 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 21-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 21-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 4, 6, 7, 9, 11-15, 21, 24, 26 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Barni (U.S. Patent No. 6,473,634).

3. Barni teaches a method and system for registering images of a patient using retrospective gating including determining a target area (col. 2 line 10-13), obtaining scout image data of the target area (abstract), processing the target area to create a plurality of sub-target areas of interest (col. 3, lines 51-54), computing a desired acquisition time having a duration greater than the duration of a breathing cycle of the patient (col. 1 line 58- col. 2 line 12), imaging each sub-target area, combining the sub-target area image data to create a set of image data (col. 3 line 11-30), processing the image data set to determine a phase and synchronizing the phase (col 4 line 25 – line 41), where the target area of interest corresponds to a size of a target and is associated with an object to be imaged (col. 6 line 42-64) , where the set of image data corresponds to the target area of interest (col. 5 line 12-60), where synchronizing the phase uses the phase to correlate image data (col. 4 line 25-41), where the system

includes an imaging device (col. 1 line 16-24), a processing device and a storage medium with machine-readable computer program code (col. 3 line 40-58), and the reference further teaches a method of assigning phases in an image by imaging an object to create image data and system data (col. 4 line 25-41), where the system data includes physiological information, that is respiratory cycle data (col. 4 line 35-36), and the imaging system information corresponds to each respiratory cycle (col. 4 line 30-36) (also see figures 1-4).

4. The Examiner has interpreted Claim 21 as means plus function language, thus invoking the sixth paragraph of 35 U.S.C. 112, and the Examiner has looked to the specification for a description of the structure claimed. Although Barni does not provide the exact structure described in the specification, it is a functional equivalent because it serves the same purpose of determining target areas and sub-target areas of interest, imaging the areas, combining and processing the image data and synchronizing the data, and it achieves the same result of registering images of a patient using retrospective gating.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 5, 10, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of General Electric Company (European Patent Application No. 1090586) (hereinafter "EP 1090586").

Barni teaches all of the features of the present invention except for expressly disclosing that the size of the sub-target area corresponds to a size of a detector in a selected axis and that the acquisition time corresponds to a physiological cycle plus at least one of two-thirds of a gantry rotation time or one rotation time. In the same field of endeavor, EP 1090586 teaches slices from a CT imaging device that correspond to the size of a detector on an axis (paras. 26 and 27 and clause 50). It would have been obvious to one of ordinary skill in the art at the time of the invention to subdivide the target area into sub-targets matching the size of the detectors when planning an imaging sequence in order to simplify the processing of the data collected. Although EP 1090586 does not explicitly teach an acquisition time of one physiological cycle plus two-thirds or one gantry rotation time, the reference does teach an asynchronous scan that offsets the gantry rotation and the physiological cycle (paras. 6 and 25). It would have been obvious to one of ordinary skill in the art at the time of the invention to use such an acquisition time in order to ensure full coverage of the physiological cycle by the imaging device.

6. Claims 8, 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of Shao et al. (U.S. Patent Application Publication No. 2003/0233039).

7. Barni teaches all of the features of the present invention except for expressly disclosing that the PET emission data is synchronized with the phase. In the same field of endeavor, Shao et al. teaches matching PET data to the respiration phase of a subject being imaged (paras. 10, 48 and 68). It would have been obvious to one of ordinary skill in the art at the time of the invention to synchronize the PET data with the phase of Barni in order to improve the alignment of the images.

8. Claims 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of Hu et al. (U.S. Patent No. 6,073,041).

9. Barni teaches all of the features of the present invention, including determining a reference point in the data (col. 4, lines 66-67 and col. 5, lines 1-60), except for expressly disclosing that a phase of zero was assigned to the reference point and a phase of 2π was assigned to a subsequent reference point, where the synchronizing included selecting images' with corresponding phases and that the phase was adjusted when the reference point occurred when the imaging system was not active. In the same field of endeavor, Hu et al. teaches a system for retrospective gating of images using an assigned phase based on the respiratory cycle, where subsequent reference points were also assigned a phase, in order to register the images, where the phase was adjusted when the reference point occurred when the imaging system was not active (col. 6, lines 58-67, col. 7, lines 1-67, col. 8, lines 1-56, col. 11, lines 10-67 and col. 12, lines 1-14). Although the particular phase values of zero and 2π were not specifically taught, Hu et al. does teach periodic cycles, thus it would have been obvious

to one of ordinary skill in the art at the time of the invention to have used such values to characterize the periodicity of the phases assigned.

Response to Arguments

10. Applicants' arguments with respect to the rejection of Claims 9-14 under 35 U.S.C. § 101 have been accepted and the rejection is rescinded. Applicant's arguments with respect to the 35 U.S.C. §102 and 35 U.S.C. §103 rejections of Claims 1-17 and 21-28 have been considered but are not persuasive.

11. With respect to Applicants' arguments regarding Independent Claims 1, 9, 15 and 21 the Examiner would like to specifically point out to the Applicants that in col. 3, lines 51-54, Barni discloses a method of subdivision of target areas into a plurality of smaller areas of interest, namely pixels or voxels. The Examiner digresses that through a broad interpretation of the Claims, that the rejection stands in light of the reference, which teaches a subdivision of a target area into a multitude or plurality of subdivisions or sub-target areas of interest as is well-known in the image processing art and disclosed in Barni.

12. With respect to Applicants' arguments regarding Independent Claim 24 the Examiner would like to specifically point out to the Applicants that in col. 4, lines 25-42 Barni discloses a method for synchronizing image data by processing image data, determining a phase (specifically capturing data at the same time during each cycle (citing both the respiratory and cardiac cycle), which knowledge of the phase is required for), cycle time, sampling window position, or data to tag as important, so as to allow for a reconstruction image. The words "processing said image data" are not particularly

limiting, as any process performed on the data could be considered processing:
including a reconstruction.

In light of the foregoing remarks, each addressing the amendments, the Examiner hereby upholds the rejection set forth by Examiner Sullivan, which follows this statement.

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel M. Lamprecht whose telephone number is (571) 272-3250. The examiner can normally be reached on Monday-Friday 7:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JML
8/28/06

Gregory L. Casler
SPE
866-217-9197